

A Pleistocene Herpetofauna from Kendall County, Texas

J. ALAN HOLMAN

AN assemblage of amphibian and reptile bones from a cave deposit in Kendall County, Texas, consists mainly of a large number of lizard and snake fossils. The snakes, representing at least 21 species, have recently been studied by Hill (MS). The remainder of the herpetofauna consists of one salamander, a few scrappy anuran remains, a turtle, and at least nine species of lizards. These additional herpetological bones form the subject of the present paper. This is the largest fossil lizard fauna known from Texas.

The fossil locality, designated Cave Without a Name, lies 11 miles north of Boerne in Kendall County, Texas. The fossils were taken from a 1-2 foot layer of red clay which lay at the base of an old shaft. A C¹⁴ date (UT lab; sample number TX 205) based on the organic fraction of a bone sample is $10,980 \pm 190$ years b.p. A few mammals have been identified and these are typical Wisconsin forms. The majority of the bones appear to be derived from the pellets cast by owls. The fossil site lies in the southeastern corner of the Balconian biotic province of Blair (1950).

Dr. Ernest Lundelius, Jr., of the Department of Geology of the University of Texas generously lent the bones for study and also provided information about the cave. Numbers are those of the Paleontological Collections of the University of Texas Bureau of Economic Geology (UTBEG). All measurements are in millimeters. My part of the work was supported by National Science Foundation Grant GB-5988.

ANNOTATED LIST

Plethodon glutinosus (Green)

Material. Vertebrae, 277 precaudal and 92 caudal, UTBEG 40450-1654.

Remarks. In the precaudal vertebral column of *Plethodon glutinosus*, the more anterior vertebrae are longer and narrower and have more delicate processes and rib-bearers than the more posterior precaudal vertebrae which are larger, shorter and wider, and have more robust processes and rib-bearers. The vertebrae of *Plethodon glutinosus* may be separated from those of *Desmognathus*,

Leurognathus, *Pseudotriton*, and *Gyrinophilus* on the basis of being amphicoelous; those of *Desmognathus* and *Leurognathus* are opisthocoelous; those of *Pseudotriton* and *Gyrinophilus* are falsely opisthocoelous (Soler, 1950). The vertebrae of adult *Plethodon glutinosus* may be separated from those of *Eurycea bislineata*, *E. longicauda*, and *E. lucifuga* on the basis of being shorter and wider. From *Plethodon cinereus*, *Eurycea bislineata*, and the troglodyte species of *Eurycea*, *Plethodon glutinosus* may be separated on the basis of its larger size. The vertebrae from the fossil site are inseparable from recent *Plethodon glutinosus*.

The recent distribution of *P. glutinosus* in Texas is fragmentary. There are two subspecies present. *Plethodon g. glutinosus* is known from only a few scattered records in eastern Texas; *P. g. albagula* is known only from the Balcones Escarpment area of Texas, being confined to Bexar, Kendall, Comal, Hays, and Travis Counties (Highton, 1962). I cannot distinguish between these two recent subspecies on the basis of vertebrae. *Plethodon glutinosus* has previously been reported from the Pleistocene of Florida (Holman, 1958 and 1959) and *Plethodon* cf. *glutinosus* has been reported from the Pleistocene of Georgia (Holman, 1967).

cf. *Rana* sp. indet.

Material. Distal half of tibiofibula, UTBEG 40450-1655.

Remarks. This element represents the tibiofibula of a frog about 75.0 in length and with the same general tibiofibial proportions of *Rana pipiens*. The fossil is more similar to the genus *Rana* than to any other North American genus, but it has features that I cannot find in any North American species of *Rana*, including a large series of *Rana pipiens*. The bone is quite flattened in an anteroposterior direction at its middle, and there is a very sharp ridge on each lateral surface. These characters do not appear to be due to pathological conditions. The greatest width of the fossil is 4.6 mm.

cf. Leptodactylidae sp. indet.

Material. Sacrum, UTBEG 40450-1656.

Remarks. This small procoelous sacrum has the ends of the sacral diapophyses broken off, but the bases of the diapophyses are relatively slender and the bone appears to conform closely to several small species of leptodactylid frogs.

Terrapene carolina (Linnaeus)

Material. Anterior lobe of plastron and pleural bone, UTBEG 40450-1657.

Remarks. These fossils are rather similar in size to turtles identified as *Terrapene carolina triunguis* from Friesenhahn Cave, Bexar County Texas (10,000-14,000 b.p.) by Milstead (1967). The anterior lobe of the plastron of the Kendall County specimen has a length of 66.8, and the peripheral bone has a greatest width of 70.1 mm. The ratio of the anterior lobe of the plastron divided into the interhumeral suture is 14.9 per cent.

Crotaphytus collaris (Say)

Material. Two left dentaries, UTBEG 40450-1658.

Remarks. The dentary of *C. collaris* may be separated easily from that of *C. wislizeni* on the basis that the ramus as well as the teeth of *C. collaris* are much more robust. The fossil dentary with a complete dentition has a slightly lower tooth count (19) than in 9 recent *C. collaris*, 20-26 (23.1), and a much lower tooth count than in 2 recent *C. wislizeni*, 24-28 (26.0). The length of the tooth row of the complete fossil measured from the last alveolus through the ramus is 12.7; this measurement in the recent *C. collaris* is 13.2-15.8 (14.01).

Holbrookia texana (Troschel)

Material. Two right dentaries, UTBEG 40450-1659.

Remarks. The dentary of *H. texana* may be distinguished from *Urosaurus ornatus* on the basis of being larger, having several of the posterior teeth tricuspid, and in having Meckel's groove closed. From *Sceloporus poinsetti*, *S. olivaceus*, *S. variabilis*, and *S. undulatus* it may be separated in having the upper border of Meckel's groove straight or only gently curved, delicate, and with the inner portion of the groove lacking a shelf. *Holbrookia texana* is smaller than *S. poinsetti* and *S. olivaceus*; it is larger than *Holbrookia maculata*, *H. lacerata*, and *H. propinqua*. Measurements of the length of the tooth row in fossil and recent *Holbrookia* measured from the most posterior alveolus through the ramus are as follows: 2 fossil *H. texana*, 7.3-8.2 (7.78); 3 recent *H. texana*, 7.2-7.7 (7.37); 10 re-

cent *H. maculata*, 4.7-5.9 (5.39); 2 recent *H. propinqua*, 5.0-5.9 (5.45).

Holbrookia texana has only once previously been reported as a fossil. This record is from the Pleistocene Cragin Quarry fauna of Meade County, Kansas (Etheridge, 1958).

Sceloporus variabilis (Wiegmann)

Material. Nine left and 15 right dentaries, UTBEG 40450-1660.

Remarks. *Sceloporus undulatus* and *S. variabilis* may be separated from *S. olivaceus* and *S. poinsetti* on the basis of the smaller size of the former two species. Moreover, the two small species may easily be distinguished from one another on the basis of tooth structure. In *S. variabilis* all of the teeth in about the posterior one-half of the dentary are very distinctly tricuspid; in *S. undulatus* the teeth in this part of the dentary are very weakly tricuspid or unicuspid. I cannot distinguish these fossils from recent lizard of the species *S. variabilis*. Measurements of 20 fossil *S. variabilis* are as follow: length of tooth row as measured from the last alveolus through the ramus, 6.2-8.8 (7.63). Tooth counts for 16 of the fossils are, 23-29 (25.6).

This is the first record of this species as a fossil.

Sceloporus poinsetti Baird and Girard

Material. Right dentary and frontal, UTBEG 40450-1661.

Remarks. The dentaries of *S. poinsetti* and *S. olivaceus* are larger than those of *S. undulatus* and *S. variabilis*. The fossil dentary appears to represent *S. poinsetti* and differs from *S. olivaceus* based on the following characters: teeth more robust, very weakly tricuspid, ramus robust (teeth more delicate, distinctly tricuspid, ramus less robust in *S. olivaceus*). The length of the tooth row of the fossil measured from the last alveolus through the ramus is 12.7 mm. The fossil bears a total of 25 teeth and alveoli. The frontal is only tentatively assigned to this species.

This is the first record of this species as a fossil.

Sceloporus undulatus (Latreille)

Material. Twenty-three left and 19 right dentaries and one

posterior part of a skull including the occipital complex and basisphenoid, UTBEG 40450-1662.

Remarks. The dentaries of *S. undulatus* and *S. variabilis* may be separated based on characters given in the section on *S. variabilis*. Measurements of 26 fossil *S. undulatus* dentaries are: length of tooth row as measured from the most posterior alveolus through the ramus, 6.9-9.0 (7.92). Tooth counts of 21 fossils are, 24-30 (26.0).

The posterior part of a skull may be assigned to *S. undulatus* and differs from *Holbrookia texana* as follows: in ventral view the sides of the basisphenoid are straight, whereas in *H. texana* they are concave. From *Sceloporus poinsetti* and *S. olivaceus* the posterior skull of *S. undulatus* differs in that it is smaller; moreover, *S. undulatus* differs from *S. poinsetti* in that the anterior border of the supraoccipital is much less irregular in shape. *Sceloporus undulatus* differs from *S. olivaceus* and *S. variabilis* in that the basisphenoid fuses with the basioccipital with no evidence of a suture line. Moreover, in ventral view, the sides of the basisphenoid are straight in *S. undulatus*, but they tend to converge in *S. variabilis*.

Phrynosoma cornutum (Harlan)

Material. Right dentary, UTBEG 40450-1663.

Remarks. The dentary of *Phrynosoma cornutum* is quite characteristic. It may be told from *P. douglassi* in that it is much shorter and has blunt, relatively low-crowned, peg-like teeth; Meckel's groove is widely open. In *P. douglassi* the dentary is longer, the teeth are more numerous, higher-crowned and pointed; Meckel's groove is closed anteriorly. In *P. modestum* the dentary is very high and it is much sculptured along its ventral surface. The teeth are minute and more numerous than in either of the preceding species; Meckel's groove is closed anteriorly. Tooth counts of recent and fossil *Phrynosoma* are as follows: fossil *P. cornutum*, 16; 10 recent *P. cornutum*, 14-18 (16.7); 1 recent *P. douglassi*, 21; 1 recent *P. modestum*, 30. The length of the tooth row of the fossil as measured from the most posterior alveolus through the ramus is 6.0.

Cnemidophorus sp. indet.

Material. Right dentary, UTBEG 40450-1664.

Remarks. The dentary is of a small form of *Cnemidophorus*,

but I cannot distinguish the species on the basis of this fragmentary bone.

Eumeces obsoletus (Baird and Girard)

Material. Four left and 4 right dentaries, UTBEG 40450-1665.

Remarks. Holman (1966) gives characteristics for the identification of this species on the basis of the dentary. Etheridge (1958) has reported the species from the Sangamon of Meade County, Kansas, and Holman (1966) has recorded it from the Wisconsin of Llano County, Texas.

Eumeces tetragrammus (Baird)

Material. Two left dentaries, UTBEG 40450-1666.

Remarks. The dentary of *Eumeces tetragrammus* may be distinguished from that of *E. obsoletus* and *E. laticeps* on the basis of the much smaller size of *E. tetragrammus*. From *Lygosoma laterale*, *E. tetragrammus* may be distinguished by its larger size and by its lower-crowned, more robust, and more closely spaced dentary teeth. *Eumeces tetragrammus* has lower-crowned, more robust, and more closely spaced dentary teeth than in *Eumeces brevilineatus*, and lower-crowned, but less robust dentary teeth than in *E. fasciatus*. The tooth count of a dentary from an adult recent *E. tetragrammus* from near La Pesca, Tamaulipas, Mexico is 24; the tooth count of the Pleistocene fossil is 24 and 25. The length of the tooth row from the last alveolus through the ramus is 5.3 in the recent Mexican specimen which has a snout-vent length of 62.0 mm. This measurement in the fossils is 5.2 and 5.3 mm. This is the first record of *Eumeces tetragrammus* as a fossil.

Another fossil *Eumeces* dentary, UTBEG 40450-1667, is rather small, but it is so fragmentary that I have not attempted to identify it to species.

DISCUSSION

Including the fossil snakes reported by Hill (MS) there are now at least 34 amphibians and reptiles known from the Cave Without a Name locality in Kendall County, Texas. These include one salamander, two frogs, one turtle, nine lizards, and 21 snakes.

The herpetofauna of the present paper includes all extant spe-

cies. Most of these animals are typical species of the Balconian biotic province of Blair (1950), but a few intrusive elements, at present almost entirely restricted in Texas to the Austroriparian and Texan biotic provinces to the east and to the Tamaulipan biotic province to the south, occur in the fossil fauna.

The following comments pertain to the Balconian species. *Plethodon glutinosus* occurs in isolated populations in the Balconian at present, but it is a characteristic Austroriparian animal (Blair, 1950). On the other hand, *Crotaphytus collaris*, *Phrynosoma cornutum*, and *Eumeces obsoletus* are widespread western forms that presently are common in the Balconian; and *Holbrookia texana* and *Sceloporus poinsetti* are characteristic Chihuahuan species that are present in the Balconian vertebrate fauna today.

Sceloporus undulatus, a widely distributed species, occurs in all of the biotic provinces of Texas today, and is represented by an eastern and western subspecies. Unfortunately, the subspecific relationships of the fossils were not determined.

Intrusive elements are *Terrapene carolina* which is absent from the Balconian biotic province today (Milstead, 1967, fig. 3), but occurs in the Texan and Austroriparian biotic provinces to the east of the fossil locality; and *Sceloporus variabilis* and *Eumeces tetragrammus* which are characteristic of the Tamaulipan biotic province to the south. According to Blair (1950) these two lizards range northward only to approximately the northern limit of the Tamaulipan biotic province.

Perhaps a somewhat moister climate with less severe winters during the time of the accumulation of the fossils might account for the presence of the eastern and southern species.

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The Museum, Michigan State University, East Lansing, Michigan 48823.

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